

**ANNEX I**  
**FIRES**  
**(STRUCTURAL, URBAN, AND WILD)**

**I.     TYPE OF HAZARD**

Fires (Structural, Urban, and Wild)

**II.    DESCRIPTION OF HAZARD**

Fires can range in scope to include structural, urban, and wild fires. For the purpose of this analysis, structural and urban fires are considered in one category, with wild fires, including forest, prairie, and grassland locations, considered separately.

Structural fires are a major problem that can affect any area of the state. The Missouri Division of Fire Safety (MDFS) indicates that approximately 80 percent of the fire departments in Missouri are staffed with volunteers dedicated to the task of fire prevention and suppression. Whether paid or volunteer, these departments are often limited by lack of resources and financial assistance. The impact of a fire to a single-story building in a small community may be as great as that of a larger fire to a multi-story building in a large city.

Because fires can occur anywhere in the state, the MDFS continues to actively promote the enactment of a statewide fire code. Although no statewide code has been enacted to date, successful legislative efforts to improve fire safety have included the following:

1.     Fire, Safety, Health, and Sanitation Inspections of Child Care Facilities (RSMo 210.252)
2.     Boiler and Pressure Vessel Safety Act (RSMo 650.200)
3.     Elevator Safety Act (RSMo 701.350).
4.     Fireworks Safety Act (RSMo 320-111)

Fires impact many aspects of society in terms of economic, social, and other indirect costs. According to the MDFS, the most costly crime in the state is arson. This should be a great concern to citizens, law enforcement, the judicial system, and the fire service sector. Fires caused by arson impact citizens through higher insurance premiums, lost jobs, loss of lives, injuries, and property loss. Primary duties of the Missouri State Fire Marshal include the investigation of fires, explosions, and any related occurrences. The investigative staff is responsible for investigating any fire requested by fire service and law enforcement within the state. This also includes explosions, bombings, and all other related offenses.

Presently, the MDFS investigative staff includes 1 deputy chief, 2 regional chiefs and 16 field investigators. This staff must cover all 114 counties and is dedicated to assisting any local or state agency and conducting quality investigations. The investigators are trained in several fields of expertise, including arson for fraud, explosives recognition, and post-blast training. The Division uses two canines specifically trained in explosives detection. Another tool utilized by the investigation unit is the Computerized Voice Stress Analyzer (CVSA).

The MDFS Training Unit develops and oversees the training curriculum being provided regionally for state certification of fire fighters, fire investigators, fire inspectors, and fire service instructors. Although fire fighter certification is not mandatory in Missouri, currently over 40,000 individuals are certified by the MDFS.

Also, the MDFS has initiated a statewide mutual aid system. This system enhances the ability of rural (volunteer) or city (paid) fire departments to handle major fires or incidents within their jurisdictions. To compliment the statewide mutual aid system, an incident management system (IMS) overhead team concept has been developed throughout the state. This should assist the rural and city fire departments in the management of a major fires, and man-made or natural disasters. Figure I-1 shows the Fire/Rescue Mutual Aid Regions in Missouri.

The MDFS is responsible for the enforcement of fireworks laws throughout Missouri. In addition to conducting inspections of any facilities involved with fireworks, approximately 1,350 permits are issued yearly to manufacturers, wholesalers, and retailers of fireworks. Persons conducting public fireworks shows are required to obtain a fireworks operator license issued by MDFS. Illegal fireworks are a concern because they can be dangerous, causing loss of lives, severe injuries, and property damage.

The Forestry Division of the Missouri Department of Conservation (MDC) is responsible for protecting privately-owned and state-owned forests and grasslands from the destructive effects of wildfires. To accomplish this task, eight forestry districts have been established in the state to assist with the quick suppression of fires (see Figure I-2). The Forestry Division works closely with Volunteer Fire Departments and Federal partners to assist with fire suppression activities. Currently, more than 900 rural fire departments have mutual aid agreements with the Forestry Division to obtain assistance in wildfire protection if needed; a cooperative agreement with the Mark Twain National Forest is renewed annually. Figure I-3 illustrates the 12 Mark Twain National Forests across Missouri.

Forest and grassland fires can occur any day throughout the year. Each year, an average of about 3,700 wildfires burn more than 55,000 acres of forest and grassland in Missouri. Most of the fires occur during the spring season, normally between February 15 and May 10. The length and severity of burning periods largely depend on the weather conditions. Spring in Missouri is noted for its low humidity and high winds. These conditions, together with below-normal precipitation and high temperatures, result in extremely high fire danger. In addition, due to the continued lack of moisture throughout many areas of the state, conditions are likely to increase the risk of wildfires. Drought conditions can also hamper fire-fighting efforts, as decreasing water supplies may not provide for adequate fire fighting suppression. Spring is when many rural residents burn their garden spots, brush piles, and other areas. Many landowners also believe it is necessary to burn their forests in the spring to promote grass growth, kill ticks, and reduce brush. Therefore, with the possibility of extremely high fire dangers and the increased opportunities for fires, the spring months are the most dangerous for wildfires. The second most critical period of the year is fall. Depending on the weather conditions, a sizeable number of fires may occur between mid-October and late November.

### III. HISTORICAL STATISTICS

Because buildings exist anywhere people live and work, fires can occur at anytime and anyplace throughout the state. The frequency of structural fires depends on a wide range of factors. These factors include, but are not limited to population or building density, building use, lack of fire codes, lack of enforcement when fire codes exist, fire safety practices (or lack thereof) by building occupants, lack of adequately equipped fire departments, and criminal intent related to arson.

Data on the frequency of structural fires is included in the National Fire Incident Reporting System Statistics (NFIRS) data provided by the MDFS (See Table I-1 below). However, according to the MDFS, almost 691 of approximately 906 fire departments have reported data used to compile the NFIRS. Without 100% reporting, definitive conclusions are not possible; however, fire departments, law enforcement offices and other agencies spend considerable manpower and funding to respond to and investigate structural fires.

**TABLE I-1**

<b>Year</b>	<b>Total Fires</b>	<b>Total Fire Dollar Loss</b>	<b>Fire Related Deaths</b>
2002	16,461	\$79,583,264	39
2003	17,996	\$68,151,344	48
2004	25,122	\$102,971,461	86

The Forest Division of the MDC is responsible for protecting the privately-owned and state-owned forests and grasslands from wildfires. To accomplish this task, eight forestry districts have been established. At the present time, the forestry districts afford intensive fire protection to approximately one-half of the state, or about 16 million acres. Within these districts, fairly accurate forest and grassland fire statistics are available from the MDC. In a typical year, approximately 3,700 wildfires occur. In 2004, 2,917 wildfires occurred in Missouri, burning 55,732 acres. Debris burning (fires resulting from land clearing, burning trash, range, stubble, right-of-way, logging slash, etc.) is the major cause of forest and grass fires in Missouri. Incendiary fires (fires willfully set by anyone on property not owned or controlled by him, and without the consent of the owner) continue to rank second in the number of wildfires that occur each year.

Table I-2 below lists the number and causes of forest and grassland fires in 2004 and the acres burned. Table I-3 shows the number of fires and acreage burned by forest and grassland fires yearly from 1993 to 2004.

**TABLE I-2**

**2004 STATEWIDE FIRES BY CAUSE**

<b>Cause</b>	<b>Number</b>	<b>Acres</b>	<b>% Number</b>	<b>% Acres</b>
Lightning	12	294.26	0.4 %	0.5 %
Campfire	21	1,073.53	0.7 %	1.9 %
Smoking	61	283.55	2.1 %	0.5 %
Debris	1,652	23,113.68	56.6 %	41.5 %
Arson	296	13,259.43	10.2 %	23.8 %
Equipment	114	1,115.35	3.9 %	2.0 %
Railroad	9	109	0.3 %	0.2 %
Children	21	97.9	0.7 %	0.2 %
Miscellaneous	731	16,386.04	25.1 %	29.4 %
<b>TOTAL</b>	<b>2,917</b>	<b>55,732.74</b>	<b>100 %</b>	<b>100 %</b>

In north and west-central Missouri, the MDC has limited firefighting forces. Forestry Division personnel, however, provide training and limited federal excess equipment to the many volunteer rural fire departments. See Figure I-2 for a map of the MDC forestry districts.

**TABLE I-3**  
**STATEWIDE FIRES AND ACRES BURNED**

<b>Year</b>	<b>Fires</b>	<b>Acres</b>
1993	2,994	31,952
1994	2,748	51,896
1995	2,910	48,907
1996	3,793	88,933
1997	2,487	29,557
1998	1,112	10,415
1999	1,348	18,270
2000	4,910	132,718
2001	2,972	41,092
2002	2,376	54,397
2003	2,378	47,692
2004	2,917	55,732

#### **IV. MEASURE OF PROBABILITY AND SEVERITY**

Even with the limited data in the NFIRS statistics, the probability of structural fires is quite high. Total monetary loss in 2004 according to the NFIRS, was over \$102 million. In addition, there were 86 fire-related deaths in Missouri during 2004. Therefore, severity could be considered moderate.

The probability of wildfires (forest, prairie, and grassland) is considered moderate overall, but may increase to high during certain periods such as spring or late fall, or under conditions of excessive heat, dryness, or drought. The severity would be considered low to moderate.

#### **V. IMPACT OF THE HAZARD**

Structural and urban fires are a daily occurrence throughout the state. Approximately 100 fatalities occur annually, as well as numerous injuries affecting the lives of the victims, their families, and many others—especially those involved in fire and medical services. Unlike other disasters, structural fires are often insidious and despicable due to the prevalence of arson. All citizens pay the costs of arson whether through increased insurance rates, higher costs to maintain fire and medical services, or the costs of supporting the criminal justice system.

#### **VI. SYNOPSIS**

With sufficient mutual aid, local fire services have adequate day-to-day fire service capabilities. The greatest risk of interaction by fires with other hazards may involve damaging earthquakes. In these circumstances, the possibility of numerous fires and reduced firefighting capabilities would greatly increase the severity of structural fires.

VII. MAPS OR OTHER ATTACHMENTS

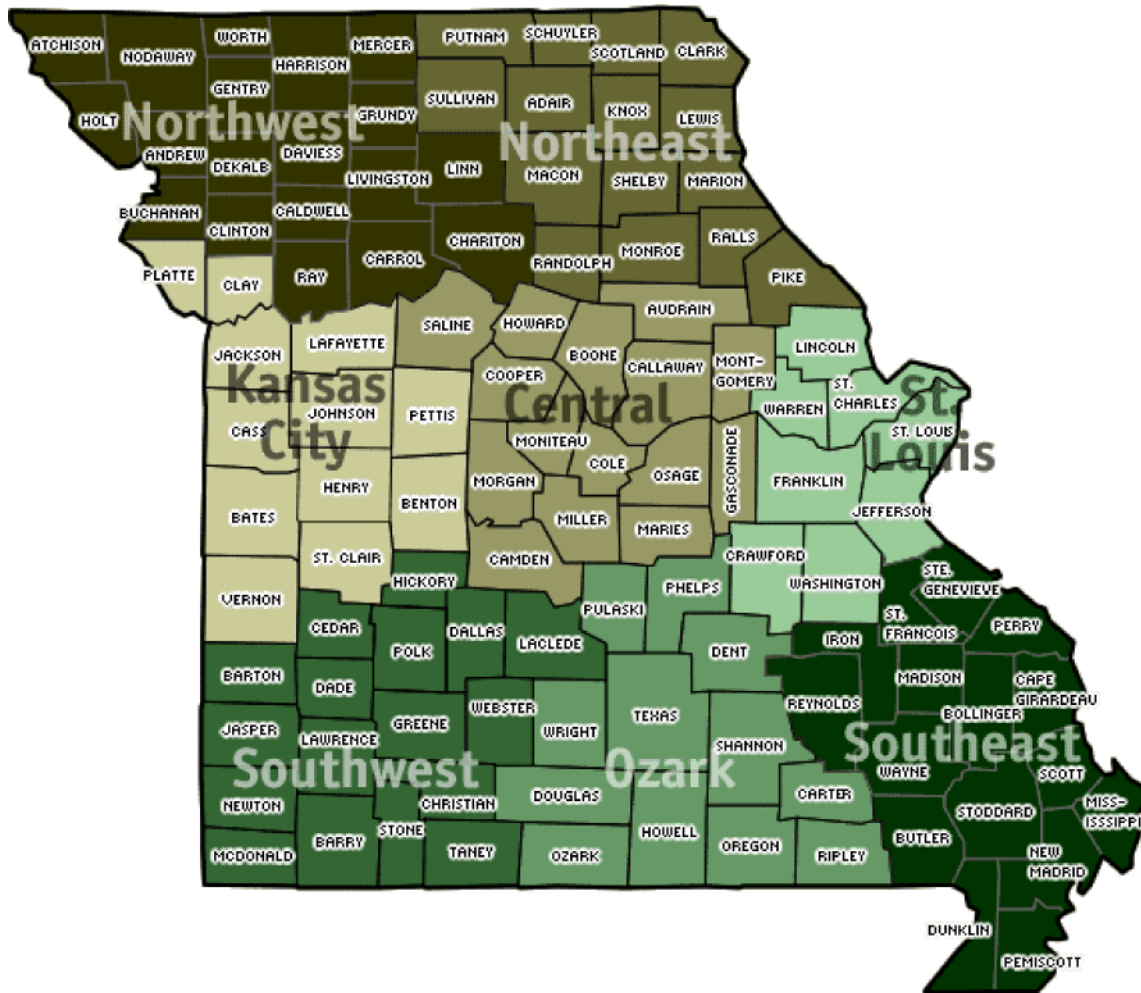
- Fire/Rescue Mutual Aid Regions: Figure I-1
- Missouri Department of Conservation Forestry Districts: Figure I-2
- Mark Twain National Forests: Figure I-3.

**FIGURE I-1**  
**MISSOURI FIRE AND MUTUAL AID REGIONS**

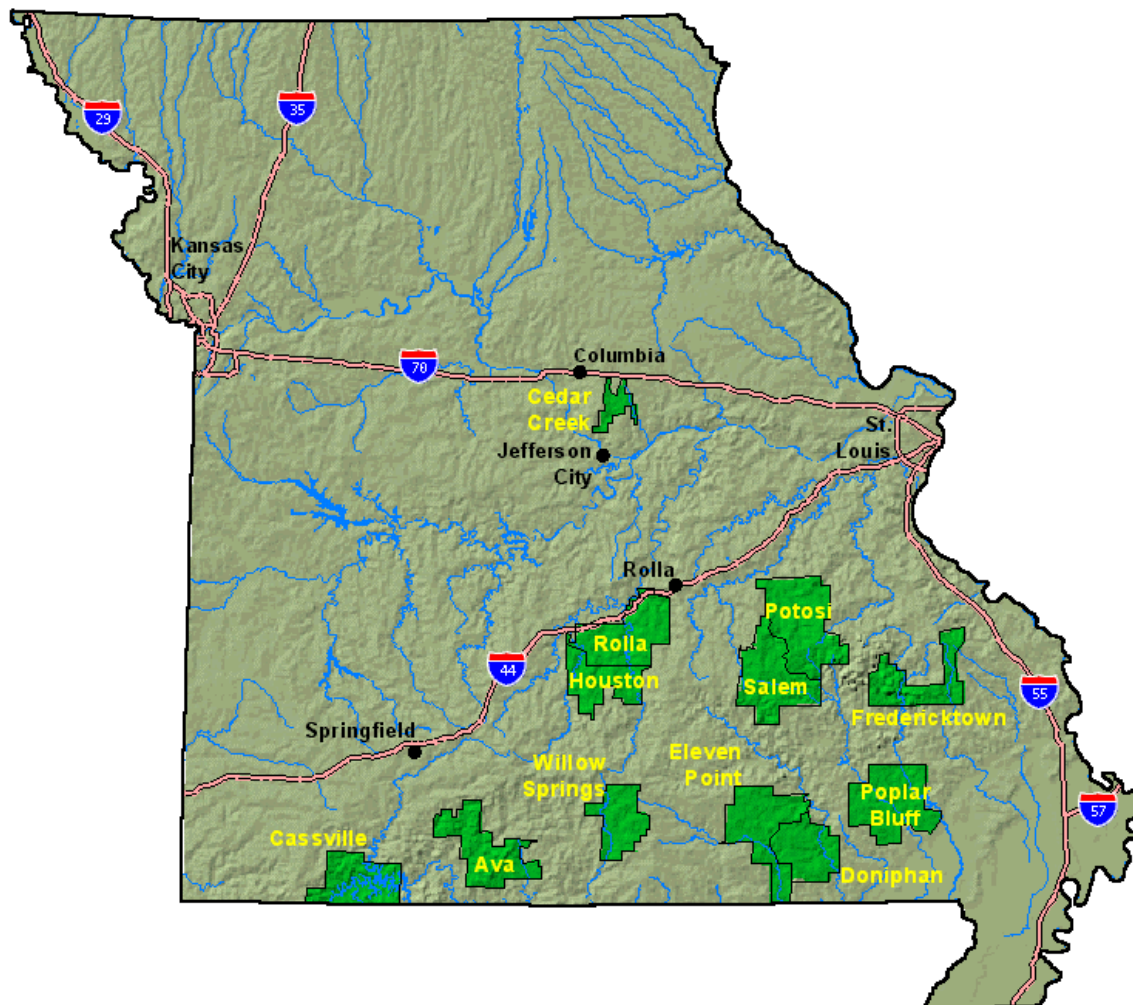


FIGURE I-2

MISSOURI DEPARTMENT OF CONSERVATION FORESTRY DISTRICTS



**FIGURE I-3**  
**MARK TWAIN NATIONAL FORESTS**



## VIII. BIBLIOGRAPHY

Missouri Department of Conservation. 2005. On-line Address:

<http://www.conservations.state.mo.us/forest>.

Missouri Division of Fire Safety. 2005.

<http://www.mdfs.dps.mo.gov/dfs.insp.htm>